



PHENIX ZDC OPERATION IN THE PEH

procedure name

PHENIX Procedure No. PP-2.5.2.2-03

Revision: C

Date: 1/25/2013

Hand Processed Changes

<u>HPC No.</u>	<u>Date</u>	<u>Page Nos.</u>	<u>Initials</u>
• <i>Typo: There are two '2.1' under 2.0 Responsibilities</i>			
• <i>Typo: Under Section 6.0, there is an error, 5.1.2 should be written as 6.1.3</i>			

Approvals

[Signature] 1/29/13
PHENIX S E & I Date

[Signature] 1/31/13
Cognizant Scientist/ Date
Engineer/Activity Manager

[Signature] 1-30-13
PHENIX /Safety Date

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REVISION CONTROL SHEET

LETTER	DESCRIPTION	DATE	WRITTEN BY	APPROVED BY	Current Oversight
A	First Issue	4/21/2001	W. Stokes	J. Haggerty, H. Ohnishi, W. Lenz, Y. Makdisi	n/a
B	Removed specific expert information appendix and replaced with generic contact info which points to web locations where info is up to date, placed after sec. 8.0	11/13/2009	D. Lynch	P. Giannotti, D. Lynch, R. Pisani	P. Giannotti
C	Reviewed and found to be OK as is	1/25/2013	D. Lynch	P.Giannotti, D. Lynch, R. Pisani	P. Giannotti

ZDC Operation in the PEH

1.0 Purpose

The purpose of this document is to define the plan for operation of the PHENIX ZDC subsystem in the PEH(PHENIX Experimental Hall).

This plan will ensure:

- 1.1 the safety of all personnel from risks associated with the operation of the high voltage systems required to power ZDC photomultiplier tubes,
- 1.2 the implementation of the appropriate emergency approaches,
- 1.3 prompt notification of the appropriate C-AD and S&EP specialists,
- 1.4 the maintenance of appropriate C-AD emergency status,
- 1.5 the preservation and protection of the environment, and
- 1.5 the preservation of BNL facilities and equipment.

2.0 Responsibilities

During run time period, there will be two levels of responsibility for the oversight of the ZDC subsystem.

The first level of responsibility will be the PHENIX Shift Crew. Prior to data taking, there will be a period of ZDC commissioning when ZDC is tested at high voltage before the IR is closed and the BBC is inaccessible.

During the commissioning phase, the ZDC HV&LV systems will be monitored primarily by the team of ZDC Experts every eight hours, at 8:00, 16:00 and 24:00. A record of the performance of the ZDC system will be kept by the experts.

During data taking, it will be the responsibility of the PHENIX Shift Crew to:

- 2.1 monitor the status and alarms for the ZDC HV system according to a prescribed check off list at least once a shift(eight hours)
- 2.1 In the event of an alarm or irregularity, contact an expert from the Expert Call List given in Appendix A.

The second level of responsibility is the experts. It is the responsibility of the BBC Experts to:

- 2.2 maintain the ZDC subsystem in a safe operating condition. This includes:
 - 2.2.1 setting, adjusting, and checking the HV&LV power supplies,
 - 2.2.2 position any special instructions or notifications as required, and carrying out any emergency action, as prescribed in the Procedures section of this document.

3.0 Prerequisites

The ZDC Experts shall have read or have training in the following areas:

- 3.1 RHIC Access & PHENIX IR Access Training,
- 3.2 BNL Electrical Safety I,
- 3.3 BNL Lock Out/Tag Out Authorized Training,
- 3.4 PHENIX ZDC subsystem specific training,
- 3.5 Geographical layout of the experimental area (routes of egress, location of emergency equipment, phones and controls)

The ZDC Experts shall train all personnel involved in the ZDC running in the safe operation of the ZDC HV&LV systems.

4.0 Precautions

The safety of personnel is of primary importance. The ZDC Experts and Shift Crew members shall take great care to ensure that the ZDC subsystem will be operated in a way that does not place personnel at risk of physical harm.

4.1 HV system precautions

The HV power supplies are current limited at less than 12 milliamp per channel. All HV points are enclosed within the sector electronics enclosure in order to eliminate the danger to personnel.

4.2 LV system precautions

ZDC utilizes high current low voltage ($\pm 6V$) power supplies to provide power required by FEM crates to operate. This power is delivered from the LV power supply rack to the detector and distributed among the crates via fuse-protected terminal blocks installed on the DIN-rails inside sector enclosure. Because the voltage is low, LV wires may stay energized while doors are open to allow test-work on FEM crates.

5.0 Standard Operating Procedures

5.1 HV system Procedures: In normal operations the experimental hall will be closed to personnel making access to any HV point impossible. Under such conditions, follow this procedure for turning on the HV:

- 5.1.1 Check that the appropriate current limits are in place for the power supply. Each subsystem shall maintain a HV logbook where the operating parameters of the HV settings are recorded. This shall include the current limits, target voltages, ramp rates, operating voltages and currents, and trip tolerances.
- 5.1.2 Check that the target voltage for each HV output line is appropriate (<200 volts). The first stage of bringing on the HV shall be a single increment in the ramp up. This is because the current trips are disabled during ramping, and in order to locate a short in the system, it is necessary to halt the ramping and check the current at the earliest possible stage.
- 5.1.3 Check that the ramp up rate for each HV supply is appropriate (<400 volts per step).
- 5.1.4 Begin ramping up the HV.
- 5.1.5 If any of the HV supplies trips, disable that channel until the reason for the trip is understood. Then begin the procedure again from 5.1.5
- 5.1.6 If there are no HV trips, verify that the operating currents are appropriate.
- 5.1.7 Change the target voltage to the correct operating voltage for each channel, as given in the operating log for each channel.
- 5.1.8 Continue ramping up the HV.
- 5.1.9 When ramping is complete, verify that the operating currents are appropriate, as given in the operating log for each channel.
- 5.1.10 HV is ready for ZDC operation.

5.2 HV system Procedures: Turning off high voltage to ZDC phototubes

- 5.2.1 Begin ramping down the HV.
- 5.2.2 Verify by the read back that the HV is off the system.

6.0 HV lock out procedure during maintenance

6.1 In the case where maintenance work is necessary during a long term shutdown, follow this procedure before you start any work to avoid working while the HV is on:

- 6.1.1 Plug out a BNC cable which is connected to the HV interlock line placed at the back plane of the HV crate which guarantees that neither a switch in the front panel nor software switches can turn on the HV.
- 6.1.2 Start the maintenance work.
- 5.1.2 Plug in the BNC cable to the original place after the maintenance.

7.0 Documentation

7.1 None

8.0 References

8.1 C-AD-OPM 3.16, "Emergency Plan for the Phenix detector building 1008 complex."

8.2 BNL SBMS

Contact Information

Contact Information for experts for this subsystem can be found on the PHENIX Internal Website in the [RUN] link at: (NOTE: replace ## by the current run number)

https://www.phenix.bnl.gov/WWW/run/##/contacts/subsys_experts.html

General PHENIX contact info can similarly be found at:

<https://www.phenix.bnl.gov/WWW/run/##/contacts/>

Gas system experts can be found at:

http://phenix.bnl.gov/WWW/tracking/gas_system/people.html